

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): Method for removal of metal cations contained in a liquid in which said liquid is brought into contact at a temperature higher than or equal to 60°C, with a chelating ion exchange resin formed from polyazacycloalkane grafted on a solid support, said resin having been conditioned, previously to said contacting, at a pH of 4 to 6.

Claim 2 (Original): Method according to Claim 1 in which the contacting is carried out at a temperature of 60 to 80°C.

Claim 3 (Original): Method according to Claim 1 in which the conditioning pH is 4 to 5.

Claim 4 (Previously Presented): Method according to Claim 1 in which the conditioning of said resin is carried out by contacting said resin with a buffer solution, in which the pH is 4 to 6, wherein the conditioning may be preceded, followed or both preceded and followed, by a rinsing of the resin with a major solvent of the liquid to be treated.

Claim 5 (Original): Method according to Claim 1 carried out continuously, said resin being placed in at least one column passed through by a current of liquid to be treated.

Claim 6 (Original): Method according to Claim 1 comprising, in addition, a regeneration step of said resin, when the latter is saturated by the fixed metals.

Claim 7 (Previously Presented): Method according to Claim 5 in which said regeneration is carried out by passing a regeneration solution through the column(s) in the reverse direction from the direction of circulation of the liquid to be treated.

Claim 8 (Previously Presented): Method according to Claim 7 in which said regeneration solution is one or more acid solutions.

Claim 9 (Previously Presented): Method according to Claim 7 in which at the end of the regeneration step, said regeneration solution containing the metals initially fixed on the resin is treated to recover the metals.

Claim 10 (Previously Presented): Method according to Claim 1 comprising a prior step for treatment of the liquid by contacting with an ion exchanger or organic or mineral adsorbent different from said polyazacycloalkane resin grafted on a support.

Claim 11 (Previously Presented): Method according to Claim 10 in which said adsorbent is one or more silica gels.

Claim 12 (Previously Presented): Method according to Claim 10 in which said ion exchanger is a polyacrylate resin.

Claim 13 (Original): Method according to Claim 10 in which said prior treatment step is carried out continuously, said ion exchanger or adsorbent being placed in at least one column passed through by a current of liquid to be treated and positioned upstream of said column filled with resin.

Claim 14 (Original): Method according to Claim 11 in which said ion exchanger or adsorbent is regenerated when it is saturated by the fixed metals under the same conditions as the resin and at the same time as regeneration of the latter and with the same regeneration solution.

Claim 15 (Previously Presented): Method according to Claim 1 in which said metal cations to be removed are one or more metal cations selected from the group consisting of transition metals, heavy metals, metals from group IIIA of the periodic table, lanthanides, actinides and alkaline-earth metals.

Claim 16 (Previously Presented): Method according to Claim 13 in which said metal cations are one or more cations selected from the group consisting of cations of U, Pu, Am, Ce, Eu, Al, Gd, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ag, Cd, B, Au, Hg, Pb, As, Ca, Sr, Mg, Be, Ba and Ra.

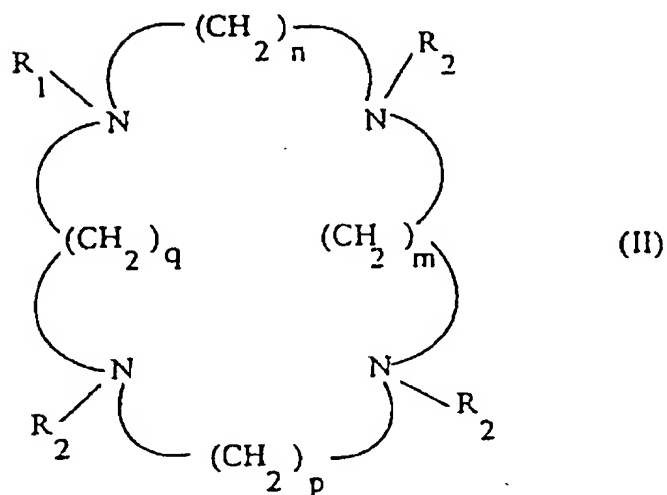
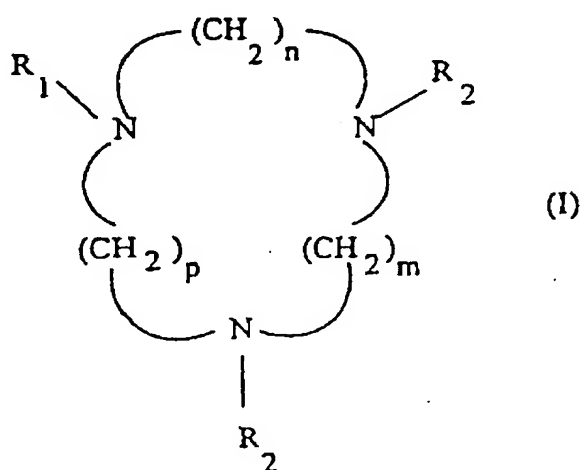
Claim 17 (Previously Presented): Method according to Claim 1 in which the treated liquid is an aqueous liquid.

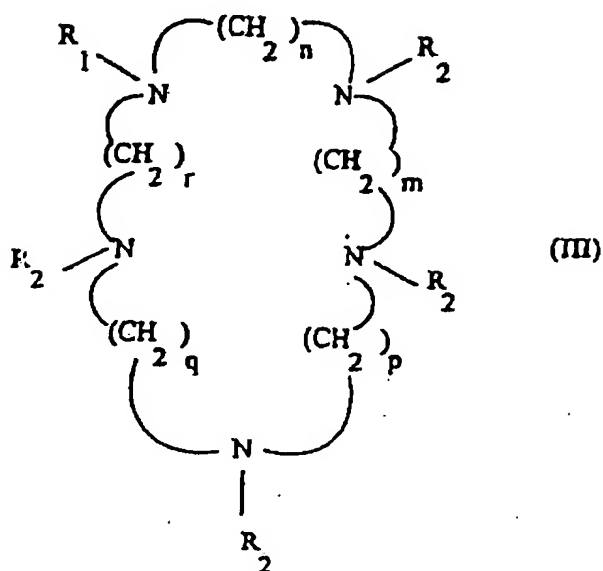
Claim 18 (Previously Presented): Method according to Claim 1 in which the treated liquid is a radioactive aqueous effluent with low activity.

Claim 19 (Previously Presented): Method according to Claim 18 in which said effluent is the aqueous effluent with low activity originating from the industrial evaporator of the treatment installation of effluents from a nuclear installation.

Claim 20 (Previously Presented): Method according to Claim 16 in which the liquid is a biological fluid and the cations removed are copper and aluminium.

Claim 21 (Previously Presented): Method according to Claim 1 in which said chelating ion exchange resin formed from polyazacycloalkane grafted on a solid support fulfils one of the three formulas (I), (II) and (III) below:





in which n, m, p, q, r which may be the same or different are equal to 2 or 3, R₁ is a solid support, R₂ represents the hydrogen atom or the (CH₂)₂-R₃ group, R₃ being a functional group chosen from the group formed by COOH, CONH₂, CH₂OH, CN or COOR₄, R₄ representing an alkyl or benzyl group, or R₂ represents the -(CH₂)-R₅ group, R₅ representing COOH or PO₃R₆, R₆ representing an alkyl group or hydrogen.

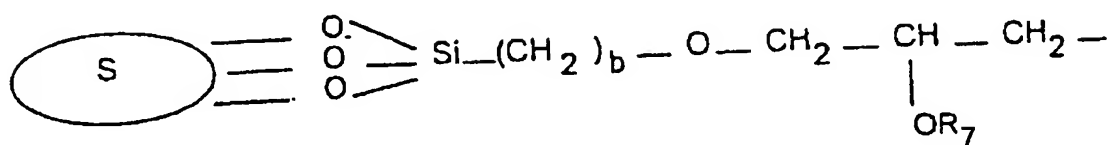
Claim 22 (Previously Presented): Method according to Claim 1 in which the solid support is an organic polymer that may or may not be crosslinked.

Claim 23 (Previously Presented): Method according to Claim 22 in which the solid support is a residue of an organic polymer that may or may not be crosslinked with alkyl halide end.

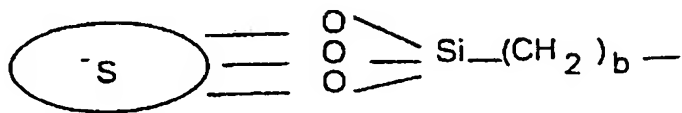
Claim 24 (Original): Method according to Claim 23 in which the solid support is a residue of chloromethyl polystyrene.

Claim 25 (Previously Presented): Method according to Claim 24 in which the grain size distribution of said chloromethyl polystyrene is between 20 and 400 mesh.

Claim 26 (Previously Presented): Method according to Claim 21 in which R1 is a solid support derived from silica fulfilling formula:



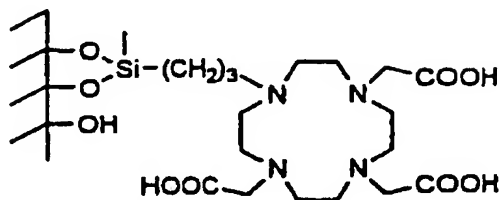
wherein in the formula:



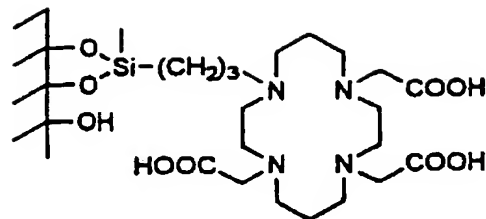
S represents a silica gel, b is between 1 and 4 and R7 is an alkyl group or a hydrogen atom.

Claim 27 (Previously Presented): Method according to Claim 26 in which the grains size distribution of the solid support derived from silica is between 20 and 400 mesh .

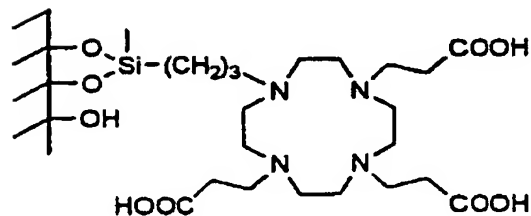
Claim 28 (Previously Presented): Method according to Claim 21 in which said resin is at least one selected from the group consisting of:



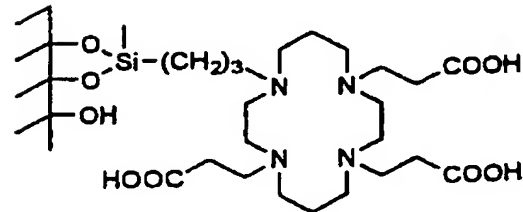
Si2222trA



Si2323trA



Si2222trPr



Si2323trPr

Claim 29 (Previously Presented): Method according to Claim 1 in which said solid support is silica, and said resin is prepared by a method in which silica is reacted with a spacer arm, then with azacycloalkane and then the substitution of the free amine functions of the polyazacycloalkane is carried out.

Claim 30 (Previously Presented): Method according to Claim 1 in which said solid support is silica and said resin is prepared by a method in which first, an unsubstituted polyazacycloalkane is reacted with a spacer arm, then said polyazacycloalkane carrying a spacer arm is grafted on the silica.

Claim 31 (Previously Presented): Method according to Claim 30 further comprising functionalizing said polyazacycloalkane carrying a spacer arm prior to its grafting on the silica.

Claim 32 (Previously Presented): Method according to Claim 30 in which the amount of polyazacycloalkane grafted per unit weight of solid support is greater than 0.4 mmol.g⁻¹.

Claim 33-35 (Canceled).

Claim 36 (Previously Presented): Method according to Claim 6 in which said regeneration is carried out by passing a regeneration solution through the column(s) in the reverse direction from the direction of circulation of the liquid to be treated.

Claim 37 (Previously Presented): Method according to Claim 17, wherein the liquid is a biological fluid and the cations removed are copper and aluminum.

Claim 38 (Previously Presented): The method according to Claim 4, wherein the conditioning of said resin is carried out by contacting said resin with an aqueous buffer solution and the major solvent is distilled water.

Claim 39 (Previously Presented): The method according to Claim 8, wherein one or more of the acid solutions is a nitric acid solution.

Claim 40 (Previously Presented): The method according to Claim 20, wherein the biological fluid is blood.

Claim 41 (Previously Presented): The method according to Claim 23, wherein the alkyl halide end is an alkyl chloride end.

Claim 42 (Previously Presented): The method according to Claim 25, wherein the grain size distribution of said chloromethylpolystyrene is between 20 and 70 mesh.

Claim 43 (Previously Presented): The method according to Claim 26, wherein b is equal to 3.

Claim 44 (Previously Presented): The method according to Claim 27, wherein the grain size distribution of the solid support is between 20 and 70 mesh.

Claim 45 (Previously Presented): The method according to Claim 29, wherein the substitution of the free amine functions is carried out by a carboxylic function group.

Claim 46 (Previously Presented): The method according to Claim 30, wherein the polyazacycloalkane is at least one of a cyclam and a cyclene.

Claim 47 (Previously Presented): The method according to Claim 32, wherein the solid support is silica.

Claim 48 (Canceled).

Claim 49 (Previously Presented): The method according to Claim 37, wherein the biological fluid is blood.